

NOT FOR PUBLICATION

**UNITED STATES DISTRICT COURT
DISTRICT OF NEW JERSEY**

UNITED STATES OF AMERICA)
)
 v.) Criminal No. 07-332 (HAA)
)
 RUSSELL CHRISTIE) **MEMORANDUM OPINION**
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 Defendant.)
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ACKERMAN, Senior District Judge:

On November 19, 2008, this Court held a hearing to determine the admissibility of Dr. Nicole Spaun, a forensic image examiner with the FBI's Forensic Audio, Video and Image Analysis Unit (hereinafter "FAVIA Unit"), as an expert witness under Federal Rule of Evidence 702 in accordance with *Daubert v. Merrell Dow Pharmaceuticals*, 509 U.S. 579 (1993).¹ The Government sought to elicit Dr. Spaun's testimony in the criminal trial of Russell Christie for the purpose of authenticating 24 still-images² and eight digital videos of child pornography that he allegedly advertised and/or possessed. After the hearing, this Court admitted the testimony of Dr. Spaun on the record and noted that it would subsequently issue an opinion stating the reasons

¹Although Defendant only requested a *Daubert* hearing to assess the extent of Dr. Spaun's qualifications, he never formally moved to exclude her testimony. Out of an abundance of caution, this Court treated Defendant's request as a motion to exclude.

²The still images comprised two series of related images, one series consisting of 21 images, and the other consisting of three images.

for this decision. In this opinion, the Court sets forth its explanation for its decision to admit Dr. Spaun.

Discussion

In *Ashcroft v. Free Speech Coalition*, 535 U.S. 234, 251–56 (2002), the Supreme Court found that the First Amendment did not permit the criminalization of virtual child pornography, which included images of youthful-looking adults and computer-generated images.³ In the aftermath of *Ashcroft*, such evidence verifying that the purported pornography depicted real children has become an important, if not essential, part of prosecuting child pornography crimes.⁴

At the conclusion of the hearing, this Court admitted Dr. Spaun's testimony under Rule 702,

³Specifically, the *Free Speech Coalition* Court struck down for overbreadth 18 U.S.C. § 2256(8)(B), which defined child pornography to include images that “appear[ed] to be [] of a minor.” 535 U.S. at 256.

⁴Indeed, after *Free Speech Coalition*, the government bears the burden of proving, beyond a reasonable doubt, that the suspect images depict real children. *See, e.g., United States v. Rearden*, 349 F.3d 608, 612 (9th Cir. 2003); *United States v. Marchand*, 308 F. Supp. 2d 498, 503–04 (D.N.J. 2004). What remains in doubt is whether the pornographic images themselves can satisfy this evidentiary burden, *res ipsa loquitur*, or whether extrinsic evidence of some sort is required. The Courts of Appeals that have considered the matter appear to agree that the *Free Speech Coalition* evidentiary burden does not require expert testimony to authenticate the images. *See United States v. Destio*, 153 F. App'x 888, 892–93 (3d Cir. 2005) (indicating that the images themselves or non-expert testimony would suffice); *cf. United States v. Salcido*, 506 F.3d 729, 734 (9th Cir. 2007) (expert testimony was not required to meet *Free Speech Coalition* evidentiary burden); *United States v. Rodriguez-Pacheco*, 475 F.3d 434, 437 (1st Cir. 2007) (same); *United States v. Irving*, 452 F.3d 110, 121–22 (2d Cir. 2006) (extrinsic evidence not required); *United States v. Farrelly*, 389 F.3d 649, 654 & n. 4 (6th Cir. 2004) (government does not have “heightened evidentiary burden” of proving the images are of real children); *United States v. Slanina*, 359 F.3d 356, 357 (5th Cir. 2004) (per curiam) (neither expert testimony nor extrinsic evidence required); *United States v. Kimler*, 335 F.3d 1132, 1142 (10th Cir. 2003) (expert testimony not required to authenticate images in cases where there is no direct evidence of the victim's identity); *United States v. Deaton*, 328 F.3d 454, 455 (8th Cir. 2003) (per curiam) (upholding jury determination that images depicted real children where government presented no additional evidence beyond the images). However, because this Court admitted Dr. Spaun's testimony and Christie does not challenge the sufficiency of the evidence against him, this Court need not decide this matter.

finding that she possessed the requisite knowledge, skill, and experience to qualify as an expert witness; that her testimony was based upon reliable principles and methodology; and that she had applied this methodology reliably to the facts of this case. (Tr. Vol. 6, Ct. Order on Nov. 19, 2008 at 50.)

Federal Rule of Evidence 702 provides that where

scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

Fed. R. Evid. 702. “Rule 702 embodies three distinct substantive restrictions on the admission of expert testimony: qualifications, reliability, and fit.” *Elcock v. Kmart Corp.*, 233 F.3d 734, 741 (3d Cir. 2000). Dr. Spaun’s testimony satisfied each of these requirements.

A. Qualifications

The qualifications component of Rule 702 requires that an expert witness possess “specialized expertise.” *Schneider ex rel. Estate of Schneider v. Fried*, 320 F.3d 396, 404 (3d Cir. 2003). The Third Circuit has “interpreted this requirement liberally, holding that ‘a broad range of knowledge, skills, and training qualify an expert.’” *Id.* (quoting *In re Paoli R.R. Yard PCB Litigation*, 35 F.3d 717, 741 (3d Cir. 1994) (Becker, C.J.)). Still, “[a]n expert may be generally qualified but may lack qualifications to testify outside his area of expertise.” *Calhoun v. Yamaha Motor Corp., U.S.A.*, 350 F.3d 316, 322 (3d Cir. 2003).

In this case, Dr. Spaun clearly possessed specialized expertise in the field of image

authentication. Following her graduate and post-graduate degrees in geological sciences from Brown University, Dr. Spaun received a post-doctoral grant to work with NASA on the Galileo mission, observing images captured of Jupiter and its moons. (Tr. 11/19/2008 (Spaun) at 11 (hereinafter “*Daubert* Hearing”).) She joined the FBI in June of 2003 and received two years of specialized training in image analysis before being certified as an image examiner. The training included sessions with some of the most advanced private graphic design studios to learn the “tricks of the trade” in the advertising industry. (See *Daubert* Hearing at 12–13.) This training also included classes in surface anatomy, focusing on “how the interior of the body affects what you see on the exterior, how the underlying bones and muscles, where they are and how they move” (*Id.* at 20.) She has been admitted as an expert witness in California federal court, as well as state courts in California, Massachusetts, and New Jersey, and she has worked on several child pornography cases. (*Id.* at 14, 16; *see also id.* at 33 (noting that she had prepared image analysis reports on between 30 and 40 child pornography cases).)

Dr. Spaun’s detailed expositions of how this training enabled her to detect realistic lighting, textures, and flesh reactions (e.g., the depression of skin beneath the pressure of fingertips) in samples of child pornography possessed by Defendant demonstrated that the image authentications proffered by the Government were within Dr. Spaun’s specialized expertise. (See, e.g., *Daubert* Hearing at 22–23.)

B. Reliability & Fit

Regarding the reliability and fit, the Supreme Court in *Daubert* and the Third Circuit in *Paoli* suggested that courts consider the following factors in deciding whether to admit expert testimony:

(1) whether a method consists of a testable hypothesis; (2) whether the method has been subject to peer review; (3) the known or potential rate of error; (4) the existence and maintenance of standards controlling the technique's operation; (5) whether the method is generally accepted; (6) the relationship of the technique to methods which have been established to be reliable; (7) the qualifications of the expert witness testifying based on the methodology; and (8) the non-judicial uses to which the method has been put.

Paoli, 35 F.3d at 742 n.8. This list is “nonexclusive,” and “each factor need not be applied in every case.” *Elcock*, 233 F.3d at 746. Courts should tailor their inquiries to the facts of each case and “consider the specific factors identified in *Daubert* where they are reasonable measures of the reliability of expert testimony.” *Kumho Tire*, 526 U.S. at 152; *see also id.* at 150 (noting that the *Daubert* factors may or may not be useful depending on the “nature of the issue, the expert’s particular expertise, and the subject of his testimony”) (citation omitted). The proponent of expert testimony must establish the admissibility of the expert’s opinion by a preponderance of the evidence. *Paoli*, 35 F.3d at 744.

In this case, the *Daubert* and *Paoli* factors counseled decidedly in favor of admitting Dr. Spaun’s testimony. Dr. Spaun described the FAVIA Unit’s methodology—the methodology she employed in this case—as follows: (a) image examiners compare the subject images to FBI databases of known child pornography images and known victims of exploitation, looking for matches; (b) image examiners assess whether the subject image has been manipulated with image processing software such as Adobe Photoshop; and (c) image examiners review the metadata of images stored in electronic files, which sometimes reveals information about such things as the camera that took the picture and the computer software programs previously used in editing a given picture. (*Daubert* Hearing at 16–17; 23–24.) After completing this process, image

examiners come to one of the following conclusions regarding the image's authenticity: (i) that the image has not been manipulated, and it depicts real people in real acts; (ii) that the image has been manipulated, but it depicts real people; (iii) that the image has been manipulated, and it does not depict real people; or (iv) it is uncertain whether the image has been manipulated and whether it depicts real people performing real acts. (*See id.* at 37.)

The FAVIA Unit was accredited in digital and multimedia evidence, a field that includes image authentication, by the independent American Society of Crime Lab Directors' Laboratory Accreditation Board in 2007, and the FAVIA Unit follows the best practices for image authentication adopted by the Scientific Working Group on Imaging Technology (SWGIT), an independent group of international, federal, state, and local law enforcement agencies that devises best practices for forensic evidence analysis. (*Id.* at 25, 27.) Dr. Spaun noted that other crime labs, such as the U.S. Army Criminal Investigation Laboratory, "perform image authentication with very similar standard operating procedures" as the FAVIA Unit, and indicated that other government agencies such as the Departments of Defense and State utilize forensic image authentication. (*Id.* at 26.)

The FAVIA Unit submits all image assessments to internal peer review by a second image examiner as part of its authentication analysis, a process that Dr. Spaun testified involves the second examiner's initial review of the subject images "to basically . . . come to his own conclusions," subsequent review of the initial examiner's report, and an assessment of whether the second examiner could testify as to the veracity of the initial examiner's report. (*Id.* at 31–32.) The specialized training of image examiners discussed above includes "Moot Court" exercises, whereby the trainee is tested on her ability to correctly assess the authenticity of

images known by the FBI to be authentic or manipulated. (*Daubert* Hearing at 35–36.)

Subsequent to certification, the FBI requires image examiners to take annual proficiency tests.

(*Id.* at 13.)

On cross-examination, Dr. Spaun recognized that the subjectivity of the methodology—its reliance on individual image examiners’ expert opinions—makes it difficult to assess its rate of error in correctly assessing the authenticity of images. (*See id.* at 36 (“Error rate is—is difficult because it really does depend on each individual, just like with fingerprints. Every individual examiner has a different error rate . . .”).) Nevertheless, she testified that her image authentication conclusions had never been rejected by the FAVIA Unit. (*See id.* at 33.)

Dr. Spaun further acknowledged that certain minor image manipulations might not be detectable by expert image examiners (*Id.* at 29–30; *see also id.* at 39 (noting that the removal of a blemish from a photograph might not be detectable by an expert).). But Dr. Spaun unequivocally rejected the suggestion that a computer artist could create an entirely virtual image undetectable from a real image: “No. [The computer graphics artist credited for designing the special effects in the movie “The Matrix”] has a quote out basically saying that would be the Holy Grail, everybody would love to meet the person who can do that. So, no, it has not been done to date.” (*Id.* at 39.)⁵ Moreover, Dr. Spaun noted the extreme difficulty in consistently

⁵ Although some of Dr. Spaun’s testimony during cross-examination appeared to suggest that it would be possible to create a virtual image undetectable from a real image (*see Daubert* hearing at 29–30), these responses addressed a broader line of questioning regarding the possibility of creating a “manipulated *or* virtual image” (*id.* at 29, ll. 21–23; 30, ll. 3–5, 10–12), and Dr. Spaun used the same “holy grail” reference in definitively rejecting the notion that someone could create a video, composed of virtual images, that would not be detectable (*see id.* at 30, ll. 13–18). She later confirmed that computers could not create undetectable virtual images of human beings. (*Id.* at 38 (“Q: . . . Did you state that it is possible to create images of humans that are not detectable to—or not [detectable] from the real thing? A: In a computer? No. It is not possible.”).)

manipulating a series of images or a segment of video (which itself consists of multiple images displayed in rapid succession), concluding that undetectable manipulations to either were not feasible. (See *id.* at 29 (referring to the possibility of consistent image manipulation throughout a series of related images, “the equivalent of, say, editing a video, [is] much more difficult and has not been shown”), 30.) The defense presented no evidence to contradict Dr. Spaun’s testimony that such image manipulations would be detectable when observed in the context of serial images and video segments.

In sum, this Court concluded that the Government had met its burden of establishing by a preponderance of the evidence that the FAVIA Unit’s methodology, the basis for Dr. Spaun’s testimony, is reliable. Although the methodology did not permit an accurate calculation of error rate, due to the subjective opinions of the image examiners, the following factors supported this Court’s reliability conclusion: specialized training in state-of-the-art image manipulation technologies and practices; yearly proficiency testing of image examiners; lab accreditation by an independent task force; adherence to best practices promulgated by an independent law enforcement association; three-step process for reviewing purported images of child pornography that cross-checks for known victims and known images of child pornography; and mandatory internal peer review. The images reviewed in this case involved 24 images, comprising two series of related images, and eight digital video segments. The defense presented no evidence impugning Dr. Spaun’s ability, in utilizing this methodology, to authenticate such serial images and video segments.

Having determined that Dr. Spaun’s testimony was based upon reliable principles and methodology, this Court had to determine that she applied those principles reliably to the facts

and data of this case—the 24 still-images and eight digital videos. Dr. Spaun testified that she applied the FAVIA Unit methodology described above to the images submitted for observation. Her testimony indicated that three of the images matched images of known child abuse victims, and that metadata of two of the images revealed information about the camera used to create those images. (*See Daubert* Hearing at 16, 28–29.) Dr. Spaun further demonstrated her image-examining abilities by analyzing a particular image for signs of manipulation during the *Daubert* hearing. From the Court’s perspective, the image depicted a nude young girl, between the ages of 5 and 10, posed bent at the waist over a rocking chair, with adult hands reaching into the picture, touching and exposing the child’s buttocks and genitalia to the camera. Dr. Spaun concluded that the picture was authentic because of the following characteristics: the picture had realistic light and shadow elements, suggesting the use of a flash camera; various items in the picture (e.g., the chair and floor tile) displayed realistic textures; realistic finger depressions where the adult’s hands touched the buttocks; and the fine-detailing of various elements of the child’s body, including the ligaments behind the knees. (*Id.* at 22–23.)

At the end of her analysis, Dr. Spaun concluded that all the still images and digital videos depicted real people engaged in real acts. (Def.’s Mot. for *Daubert* Hearing, Doc. No. 60, Ex. A). The defense presented no evidence challenging Dr. Spaun’s application of the FAVIA Unit’s image examination methodology to the images examined in this case.⁶ Consequently, on the

⁶The defense later declined to cross-examine Dr. Spaun regarding her methodology during the trial. It bears mentioning that, although this Court serves a gatekeeping role under *Daubert*, Rule 702 “[was] not intended to serve as a replacement for the adversary system.” *United States v. 14.38 Acres of Land Situated in Leflore County, Miss.*, 80 F.3d 1074, 1078 (5th Cir. 1996). “Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence.” *Daubert*, 509 U.S. at 596 (citation omitted).

basis of Dr. Spaun's testimony and her demonstration in court, this Court concluded that Dr. Spaun's examination of the images in this case fit the FAVIA Unit's reliable methodology of image examination.

In accordance with *Daubert*, this Court based its reliability determination "solely on [the] principles and methodology" utilized by Dr. Spaun and the FAVIA Unit in this case, and "not on the conclusions [that] they generated." *Daubert*, 509 U.S. at 595; *see also Gen. Elec. Co. v. Joiner*, 522 U.S. 136, 146 (1997) ("[N]othing in either *Daubert* or the Federal Rules of Evidence requires a district court to admit opinion evidence that is connected to existing data only by the *ipse dixit* of the expert. A court may conclude that there is simply too great an analytical gap between the data and the opinion proffered."). Having found that the testimony was relevant and not unduly prejudicial, and having concluded that it met the prerequisites of Rule 702, this Court admitted Dr. Spaun as an expert witness.

C. *Frabizio* Inapplicable

During the course of the parties' briefing on the *Daubert* matter, it was brought to this Court's attention that a court in the District of Massachusetts had previously disqualified another forensic image specialist from the FBI's FAVIA Unit in *United States v. Frabizio*, 445 F. Supp. 2d 152, 170 (D. Mass. 2006) (Gertner, J.). The defendant in *Frabizio* had been charged with the possession of still-photo images of child-pornography, and that court determined after a *Daubert* hearing that the FAVIA Unit specialist could no more determine the authenticity of the child pornography images than a lay person. *Id.* at 170. In excluding the testimony, Judge Gertner relied upon a "significant body of [scientific and legal] literature" and defendant-supplied

exemplars of computer-generated images, which the court found indistinguishable from real images, as well as the image examiner's own concessions regarding the feasibility of freelance computer artists creating undetectable computer-generated images. *Id.* at 157–59. Although not binding on this Court, *Frabizio* must be addressed because it is one of the few published decisions on the admissibility of expert testimony in child pornography cases, and because of its analysis of the FAVIA Unit's methodology. While this Court has no occasion to comment on the merits of *Frabizio* based on the facts presented in that case, this Court concludes that the *Frabizio* rationale is not compatible with the evidence in this case.

In this case, all of the images were either part of a series of related images or part of a digital video; *Frabizio* only involved still images. This distinction is important, as is the image examiner's testimony in each case regarding the feasibility of duplicating such images in a manner that could not be detected. The image examiner in *Frabizio* conceded that it was possible to create undetectable virtual images of child pornography, and the defense supplied a body of literature, as well as demonstrative exemplars, to support this conclusion. 445 F. Supp. 2d at 157–59. Naturally, such evidence worked against a finding that the FAVIA Unit employed a reliable methodology for authenticating images of child pornography. Yet in this case, the image examiner steadfastly denied that computer graphics specialists could fashion undetectable virtual images, and she repeatedly rejected the suggestion that image manipulations could be consistently made throughout serial images or video segments.⁷ Meanwhile, the defense in this

⁷In particular, Dr. Spaun's emphasis on the difficulty of consistently manipulating serial images and video segments makes practical sense. According to Dr. Spaun, in order to manipulate the image of an adult to look like a child in serial images or videos, such alterations would have to occur consistently throughout the series of images, with a degree of precision not yet accomplished by the best in Hollywood. (See *Daubert* Hearing at 29–30.)

case offered no evidence contradicting the veracity of these statements, and additional reliability factors, apparently due to recent developments in the methodology, favored the admission of Dr. Spaun's testimony: namely, the FAVIA Unit's accreditation in 2007; adherence to best practices prescribed by SWGIT; and the adoption of yearly proficiency testing for image examiners.⁸

The conclusion in *Frabizio* that an expert witness could no more differentiate between a virtual and real child pornography images than a lay juror, 445 F. Supp. 2d at 155, has not been adopted by any subsequent court. The Court of Appeals for the Ninth Circuit in *United States v. Salcido* declined to extend the reasoning of *Frabizio* in a case challenging the district court's authenticity determination regarding video files of child pornography. 506 F.3d at 734 (noting that "the persuasiveness of the *Frabizio* court's analysis is significantly limited" to the context of still images). Meanwhile, the Supreme Court of New Hampshire has suggested that widespread adoption of the *Frabizio* conclusion—that virtual and real child pornography are indistinguishable—would be inconsistent with the U.S. Supreme Court's presumption that the existence of real child pornography demonstrates the inability of child pornographers to create flawless, victimless duplicates. *State v. Clark*, 959 A.2d 229, 233 (N.H. 2008) (quoting *Free Speech Coalition*, 535 U.S. at 254 ("If virtual images were identical to illegal child pornography, the illegal images would be driven from the market by the indistinguishable substitutes. Few pornographers would risk prosecution by abusing real children if fictional, computerized images would suffice.")).

In admitting Dr. Spaun, this Court declined to adopt the *Frabizio* conclusion, finding it

⁸It also appears that the internal peer review procedure has undergone some modifications as well, evolving from what was perceived as a rubber-stamp process in *Frabizio*, to a system where the second examiner first reviews the materials to draw his own conclusions before reviewing the initial examiner's report. (See *Daubert* Hearing at 31–32.)

inapposite to this Court's analysis of the FAVIA Unit's methodology for authenticating serial images and video segments.

Dated: March 17, 2009
Newark, New Jersey

/s/ Harold A. Ackerman
U.S.D.J.